REPLACEMENT SPECIFICATION PARAGRAPHS

Please amend the following paragraphs as indicated below:

[0041] Turning to Figs. 3-5, each processor 50 includes a head 53 and a base 63. The base is preferably attached to the frame 42 and does not move. The head 53 is supported on an actuator arm 51 (shown in Fig. 4) which lifts and lowers the entire head 53, to engage and separate the head 53 and the base 63. The head 53 includes an upper frame ring 66 that is engageable with a lower frame ring 68 on the base. A cover 52 over the upper frame ring 66 isolates the interior components of the head 53 from the outside environment. An upper rotor 56 in the head 53 is engageable with a lower rotor 58 in the base 63 to form a processing chamber 65 around a workpiece 60. When the head 53 is moved into engagement or contact with the base 63, the upper rotor 56 moves into engagement with the lower rotor 58. [[A]] As shown in Fig. 5, a seal or o-ring 70 is preferably included between a flange 78 of the upper rotor 56 and the lower rotor 58, to control fluid flow in the processor 50.

[0042] Referring ~~still to Figs. 3-5,~~ to Fig. 5, a first or upper fluid applicator 57 delivers a processing fluid through an opening in the upper rotor 56, preferably to a central region of the upper surface of the workpiece 60. A second or lower fluid applicator 59 in the lower frame ring 68 delivers a processing fluid through an opening 90 in the lower rotor 58, preferably to a central region of the lower surface of the workpiece 60 and/or to an edge region of the workpiece 60, as described below. The first and second fluid applicators 57, 59 may include nozzles, orifices, brushes, pads or other equivalents for applying or delivering processing fluid to the workpiece.

[0043] [[One]] As shown in Fig. 5, one or more drain outlets 80 are preferably located at or near the perimeter or outer edge of the upper rotor 56 for removing processing fluids from the processing chamber 65. Additionally, one or more horizontal weep holes 81 extend through the flange 78. In a preferred embodiment, three spaced apart horizontally oriented weep holes are provided (each having a diameter of about .010 to .060 or more preferably 0.018 to 0.024 inches) for draining processing fluid trapped between the flange 78 and the lower rotor 58, above the seal 70.

[0047] Each shoulder 92 on the lower rotor 58 preferably includes upwardly projecting lower workpiece support pins 96 for supporting the workpiece 60 and for spacing the workpiece 60 from the interior face or surface 95 of the lower rotor 58, shown in Fig. 11. The shoulders 92 are preferably spaced apart to provide a loading/unloading slot 98 between them, shown in Fig. 11, for receiving an end effector or other workpiece loading device. Accordingly, an end effector supporting a workpiece 60 may enter the lower rotor 58 through the slot 98 between the shoulders 92, and then set the workpiece 60 onto the lower support pins 96, when the processor 50 is in the open position. As shown in Figs. 3, 11 and 13, the pins 96 on the shoulders 92 support the workpiece or wafer 60 in a plane P (shown in dotted line in Fig. 13) above the ~~upper~~ surface ~~97~~ 95 of the lower rotor. The lower surface of the workpiece or wafer 60 is therefore spaced vertically apart from the surface ~~97~~ 95 by e.g. from 2-10 or 4-6 mm. This allows the end effector of the robot to move in under the workpiece, for loading or unloading the workpiece into the processor. In contrast, as shown in Fig. 5, the spacing between the lower interior surface 101 (Fig. 9) of the upper rotor 56 and the workpiece 60 is much less, typically 1, 2, 3 or 4 mm (when the processor is closed or in the

process position). As also shown in Fig. 9, the surface 101 of the upper rotor has a slightly conically tapered section 103, running at an angle of 2-8 or 4-6 degrees.

[0049] As shown in Figs. 5-8, the shaft or axle 84 of the motor 54 connects directly to the motor plate 64 on the upper rotor assembly, via a shaft ~~plate~~ end 73. Consequently, as there is a more direct connection between the shaft 84, which defines the spin axis, and the pins 100, which position the workpiece. In contrast to earlier designs, spin concentricity is improved (to about ± 0.5 mm or better). In earlier designs where the workpiece is positioned by pins or other features on the lower rotor, the accumulation of dimensional tolerances can result in significant eccentricity (e.g. ± .9 mm) between the spin axis and the workpiece.

[0050] As shown in Fig. 5, the upper rotor 56 has a liner or chamber plate 77 preferably made of a corrosion resistant material, such as Teflon (Fluoropolymer resins). The chamber plate is attached to the motor plate 64. The motor plate 64 and other components in the head 53 are typically metal, such as stainless steel. The lower rotor, as shown in Figs. 11-13, will also typically be made of a corrosion resistant material or plastic, such as Teflon or PVDF. This allows the processor 50 to better resist corrosion caused by highly reactive gases or liquids, such as acids, used in processing. The pins 100, shown in Figs. 7-10, are secured into the motor plate 64 and pass through the chamber plate 77. Typically 10 pins 100 are evenly spaced apart on the upper rotor, although more or less pins may be used.

[0051] Referring to Figs. 3-6, on or in the head 53, the cover 52; motor housing 55; motor 54, fluid applicator 57 and upper frame ring 66, are fixed in place and do not rotate (although they can lift up vertically). The shaft or axle 84 (which is connected to

or forms part of the motor shaft); shaft ~~plate~~ end 73; motor plate 64 including the flange 78, the skirt 76 and the liner plate 77, all rotate together when the motor 54 is turned on.

[0052] Referring to Fig. 4, in [In] or on the base 63, the lower frame ring 68; drain 108; valve 106; cam actuator 104; and the fluid applicator or nozzle 59, are preferably fixed in place, and do not rotate. The lower rotor 58 including the seal 70, cams 72, latch ring 74 and other attached components shown in Figs. 11-13, rotate with the lower rotor, when the lower rotor is engaged with and driven by the upper rotor.

[0054] Referring again to Figs. 1 and 2, in [In] use, a pod, cassette, or container 38 is moved onto the input/output station 36. If the container is sealed, such as a FOUP or FOSBY container, the container door is removed, via robotic actuators in the system 30. A robot 44 then removes a workpiece 60 from the container 38, places the workpiece into a processor, and sets the workpiece 60 onto the lower support pins 96 of the lower rotor 58. [To] As shown in Figs. 5 and 6, to place the workpiece 60 onto the lower support pins 96, the robot moves an end effector, or similar device supporting the workpiece 60, through the loading/unloading slot 98 in the lower rotor 58, and lowers the workpiece 60 onto the lower support pins 96. The robot 44 then withdraws the end effector from the processor 50. While the processor 50 could alternatively be provided as a stand alone manually loaded system (without the input/output station 36, the robots 44, or the enclosure 32), the automated system shown in Figs. 1 and 2 is preferred.

[0055] [The] Referring to Figs. 4, 5 and 8, the upper and lower rotors are then brought together into engagement with each other, preferably by lowering the head 53

down into contact with the base 63. As this occurs, the upper rotor 56 is lowered down toward the lower rotor 58. The tapered leading ends of the alignment pins 100 on the upper rotor 56 move into the tapered openings or slot 94 in the lower rotor 58 to center the workpiece with the drain groove 83 in the upper rotor and to form the processing chamber 65 around the workpiece 60. The inner edge of the tapered portion of each alignment pin 100 preferably contacts the edge of the workpiece 60 to center the workpiece 60 within the processing chamber. As a result, the workpiece 60 is positioned concentrically with the vertical spin axis 75 of the processing chamber and with the drain groove 83. This helps to provide uniform and efficient processing, particularly edge processing, of the workpiece 60.

[0056] When the upper rotor 56 is lowered into engagement with the lower rotor 58, the upper support pins 110 on the upper rotor 56 closely approach or contact the upper surface of the workpiece 60 to secure or confine the workpiece 60 within the processing chamber. [After] <u>Turning to Figs. 3, 4 and 5, after</u> the rotors are brought together, cam actuators 104 in the base 63 move down, causing cams 72 to pivot and release sections of a latch ring 74. The latch ring sections then move radially outwardly and into grooves 82 in the flange 78 of the upper rotor. This operation is described in U.S. Patent No. 6,423,642, incorporated herein by reference. The lower rotor 58 is thus secured to the upper rotor 56 to form a combined rotor unit or assembly 85 (Figs. 7 and 8).

[0058] At the perimeter of the processing chamber 65, used processing fluid moves out of the processing chamber through the drain outlets 80 and/or other weep holes 81 or drain paths in the upper and/or lower rotors 56, 58, due to the centrifugal

force. The used fluid collects in a drain area 108 shown in Figs. 4 and 5 and may be delivered to a recycling system for reuse, or to a disposal area for proper disposal, by opening a valve 106.

[0070] Additional system components, such as an IPA vaporizer, a DI water supply, heating elements, flowmeters, flow regulators/temperature sensors, valve mechanisms, etc. may also be included in the processing system 30, as is common in existing systems. All of the various components of the processing system 30 may be under the control of a controller unit 34, shown in Fig. 1, having appropriate software programming.

[0076] Turning to Fig. 20, in an alternative processor 150, an air supply line or snorkel 152 has an inlet or opening 155 vertically above the head 53. Typically, the inlet 155 is near the top of the enclosure 32, adjacent to the system air filters 35 shown in Fig. 1. A vertical riser section 154 of the snorkel 152 connects into a horizontal section 157 and into an air pipe 156. The air pipe 156 is joined to a lower nozzle 158 positioned to spray up onto a bottom surface of a workpiece, through an opening in the lower rotor. The lower nozzle 158 preferably has multiple spray outlets, with one or more spray openings connecting to one or more process fluid sources. The snorkel 152 supplies clean air to the bottom surface of the workpiece, when the rotor assembly (the upper rotor 56 joined with the lower rotor 58) spins. The low air pressure adjacent the center of the spinning rotor assembly draws air in through the lower nozzle 158. The air sprays upwardly from the nozzle 158 onto the lower surface of the workpiece. Drying of the lower surface is achieved more quickly.